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ground is soft, or after rain, the wheels often sink very deep into it, which very much delays the work.

Description of a process by which all kinds of Liquids may be Evaporated at six times less Expence than by any known process; by M. Curandau.

(From the Annales des Arts et Manufactures.)

Among the different methods that have been practised or taught for concentrating the juice of the grape, some are attended with the inconvenience of injuring it during the concentration, and others are much too expensive, or are not simple enough to be adopted with advantage.

It occurred, therefore, to me, that a process which should be free from the above inconveniences, and at the same time should unite the advantages of economy and simplicity, would be the more favourably received, as it would greatly contribute to the prosperity of various establishments.

The process is founded on the well-known principle, that air, at the temperature of 10 degrees of Reaumur, and which is saturated with moisture, acquires again the property of dissolving water according to the different degrees of heat by which it is successively tried. To apply this principle to the evaporation of liquids, it requires,

1st. That a large volume of air be heated at a small expense.

2d. That the air be renewed in proportion as its dissolving and desiccative action is exhausted.

3d. That the greatest surface possible be given to the liquids that are to be concentrated.

4th. That no mechanical means be employed, nor any expensive manipulation, either to bring the liquid to the desired degree of concentration, or to collect it when it arrives at the last point of evaporation.

These four conditions are complied with in this new process.

In order that the description of the apparatus may be understood, it is sufficient to represent a square place, five metres on each side, by fifteen metres in height. Within this square, at about seven centi-

metres distance, are suspended cloths which are wetted with the liquid that is to be evaporated; below each cloth, in a parallel direction, are small gutters, sensibly inclined, which carry to a common reservoir the liquid that drops from the cloths. Above the square is a reservoir that contains the liquid to be evaporated, which communicates with a series of conduits placed upon a line parallel with the suspended cloths; in each conduit there is a number of little syphons, sufficient to supply the cloths with moisture, in proportion as the evaporation that takes place causes the concentration of the liquid that drops from them.

When the whole is thus disposed, the air of the drying place is to be heated: which is to be done by creating a communication between the square and a current of air at forty degrees, the volume and thickness of which is regulated according to the time in which it is desired to complete the evaporation.

My ventilating apparatus may be applied with much advantage in this process, since with a little fuel a considerable volume of air may be heated, and without resorting to any mechanical means, the quantity and velocity of the heated air that is introduced into the drying place may be augmented or diminished at pleasure. As I have already applied this method in the drying-houses of several manufactories, I can ascertain the expense of the fuel that is consumed by it.

In the first place, I am certain that the fire place of a ventilating stove of large dimensions cannot burn more than 200 kilogrammes of coals in twenty four hours; in the second place, experience has convinced me, that the heat which is evolved in these twenty-four hours with 200 kilogrammes of coals, is sufficient to dry 1200 pieces of cloth, containing each 4,800 kilogrammes of water. Now, if an almost absolute dessication of these pieces of cloth could produce only a part of the effect that would be obtained if the warm air had acted on cloths constantly wet, it is no exaggeration of the product to reckon it at 5,000 kilogrammes, which is the weight of the water that is evaporated in a drying house where a permanent moisture is kept up.

If, however, this result be compared with those that are obtained by processes which are looked upon as more advantageous, it will be found that in evapor-

ating 5,000 kilogrammes of water, by these processes seventy-five francs of fuel are consumed, while by my new method the expense does not amount to more than ten francs.

I have shown above, that my process may be employed with advantage in other operations besides that of concentration, such as saltpetre and salt-works: in the first mentioned, there is much water to be evaporated, which has hitherto been effected by slow and very expensive methods, the other is something similar.

GENERAL OBSERVATIONS.

In bringing into use that property which warm air possesses of speedily drying humid substances that are submitted to its action, it is necessary, in order to obtain all the effect possible from such a powerful medium, that fresh warm air should expel from the drying place that which successively loses its dessicating property. For this purpose a number of small holes must be bored in the upper part of the drying place, that the damp air which is to be expelled may oppose no resistance to the fresh warm air that is to supply its place.

Another important observation is, that the hygrometrical state of the atmosphere, the greater or less affinity of the water for the substance that it holds in solution, and lastly, the different degrees of concentration to which the liquids are to be brought, are so many causes which concur to render variable the quantity of water that is evaporated in equal spaces of time.

The cloths that are employed to augment the surface of the liquids should be loosely woven, and composed of the coarsest materials.

It is also of consequence, in the preparation of the syrup of grapes, that the cloths be quite clean, and contain no colouring particles, and on that account they should be put through four or five lessives, taking care between each lessive to expose them on the grass for several days. In consequence of this preparation, they cannot communicate any foreign taste to the syrup; they also acquire the property of being uniformly permeable to water, a property on which the success of the operation depends.

In order to regulate the degree of concentration to which any liquid is to be brought, it must be so managed, that the quantity of liquid which runs from the

reservoir upon the cloth shall be in such proportion, that when it comes to the lower part of the cloth, it shall have acquired exactly the degree that is desired.

At first sight, one is led to believe, that this part of the operation must be attended with difficulties; but they are soon removed by the augmentation or diminution of the liquid, according to the greater or less degree of concentration to which the syrup or saline solution should be brought.

Account of a Method of making a Cement capable of resisting Wet and Frost; by M. C. de Puymaurin.

(From the *Annales des Arts, &c.*)

The author observes, with reason, that an invariable rule for making cements cannot be given, because, in that case, it would be necessary, every where to be provided with the same sort of limestone, and sand of the same quality; and that it remains with the person who makes it, to examine the nature of the lime that he employs, and especially the quality of the sand and the siliceous matters that are at his disposal, in order to vary the proportions accordingly. The following is the author's method:

He takes two measures of river gravel, well washed, or fragments of bricks about the size of hazel nuts, two measures of fragments of tiling and the scoria of iron, coarsely pounded, one measure of river sand, well washed, and one of pounded lime, hot from the kiln.

A circle is formed in the sand, into which the lime is thrown and quenched, taking care to beat and mix it well. When the lime is well tempered, it is left in that state for about three hours, that it may all be perfectly quenched. The river gravel, the iron, the tiling and sand are afterwards mixed by degrees; the whole is then well beaten for half an hour, that every fragment of tiling and siliceous stone may be perfectly incorporated.

When the cement is nearly arrived in a state for use, about a bushel of quick lime in powder is thrown upon it; the mortar becomes by that means very difficult to stir, and a quart or two of size is thrown in, which penetrates into and cements all the parts.

This cement may be used with success.